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ABSTRACT

A study was done to identify social, economic, and childhood characteristics of high and low achieving children living in adverse environmental conditions, and to test the association between achievement and specific risk and protective factors. In addition, the study identified the most powerful model for predicting achievement by comparing models. Using the National Educational Longitudinal Study of 1988, a baseline of data on school experiences was collected on a stratified sample of approximately 25,000 eighth grade children in 1,052 schools across the United States. The final sample consisted of 900 students, of whom approximately 500 were Black, 200 were Hispanic American, and 200 were White. In addition, four components constituted the base year study design: a student questionnaire and cognitive test, parent questionnaires, teacher questionnaires, and a school administrator questionnaire. Analysis of the data and comparison of five models found the following: (1) differences among all ethnic groups in reading and mathematics achievement; (2) more risk and protective factors for White students than other groups and more risk factors for Black and Hispanic Americans; and (3) differences across ethnic groups between high and low achieving students. Included are 16 tables, a 48-item bibliography, and an appendix containing 8 tables of data. (JB)

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Risk and Protective Factors and Achievement of Children At Risk

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Powerful but disturbing evidence documents that children from low socioeconomic environments suffer long term educational consequences (Keogh, 1986; Nichols & Chen, 1981; Werner,1986). Associated with low socio-economic environments are child and family-related risk factors which threaten normal development and contribute to low achievement (Ramey and McPhee,1986). However, there is evidence to support that despite living in adverse conditions, children exhibit a range of achievement outcomes. In fact, many children living in poverty do quite well in school. Termed resilient, or, "vulnerable but invincible", these children manage to achieve in the face of socioeconomic adversity (Werner,1986). Thus, it is recognized by researchers that risk factors alone fail to account for a range of child outcomes, and that there are

positive influences that ameliorate the influence of a negative environment Garmezy,1981; Rutter,1976).

Yet, despite the movement away from using a deficit model of child development to predict child achievement and towards a model which recognizes positive contributors, it remains unclear as to how environmental risk and protective factors are combined and associated with school achievement. For example, there is lack of theoretical consensus as to whether a risk condition is a result of an accumulation or an interaction of risk factors, and,thus, whether risk factors should be added or multiplied (Keogh,1989; Rutter,1985; Werner,1982). In addition, although there is agreement that some risk factors are more detrimental to child development than others, there is no systematic procedure for assigning weights to risk factors nor protective factors. Finally, there are those who maintain that the identification of the most powerful single risk factor is the most parsimonious model to use in predicting child outcomes (Keogh, 1989).

Further, problems remain regarding the accuracy of past and present models of risk in predicting achievement. For one, although risk models are fairly accurate for making long term predictions for groups of children they are not reliable in making individual predictions. Models for predicting child outcomes are typically used to make group comparisons and are imprecise for determining which risk and protective factors are associated with achievement according to individual children.

In addition, risk models have not been used to examine risk and protective factors across all domains associated with child achievement. Historically, the use of risk models have been limited to the examination of child and family characteristics (Keogh,1989). A noticeable absence from this research are school and neighborhood characteristics. In view of evidence that schools in low income neighborhoods achieve below the national norms in reading and math, the contribution schools and neighborhoods make towards the continuation of a child's risk condition is put into question and therefore obviates the need for examining school and neighborhood risk factors. However, since a high percentage of children in low income neighborhood schools achieve in reading and math at or above the national norm, a model is called for which also recognizes the existence of school and neighborhood protective factors (Ingalls, 1990).

Finally, SES, which has been used to represent a composite of variables such as level of income, parent education and occupation, traditionally has been used as a single variable in predicting achievement and has often been confounded with ethnicity. Income historically has not been controlled for so that other important family-related variables can be systematically examined by ethnicity. In summary, the above deficiencies in research on children at environmental risk obviate the need for a systematic and comprehensive identification of risk and protective factors across child, family, neighborhood, and school domains, an

understanding of their relative contribution to achievement, and an understanding of how protective factors mitigate against risk factors for individual children.

The purpose of this study is to identify social, economic-related, and child characteristics of high and low achieving children living in adverse environmental conditions and to test the association between achievement and specific risk and protective factors identified in longitudinal studies of risk across child, family, neighborhood, and school domains. Secondly, an identification of the most powerful model for predicting achievement will be made by comparing the relative predictive power of the most often used risk models for predicting achievement: unweighted and weighted main effect, additive, multiplicative, and compensatory models . This author believes that a weighted compensatory model which incorporates both risk and protective factors across child, family, neighborhood, and school domains will be the most predictive of individual student achievement.

Because of the large number of minority children in the sample and the interests of this study, the following hypotheses address child, family, neighborhood, and school-related differences that may exists among groups of minority children. It is hypothesized that there will be differences in significant correlations between child, family, neighborhood, and school variables and measures of achievement across Mexican-American, Black, and White

children. It is also hypothesized that some risk and protective factors will be more important determinants of achievement than others and that these may vary according to ethnicity. It is further hypothesized that there will be differences between mean scores of risk and protective variables of high and low-achieving Black, Mexican-American, and white students across all domains. Finally, it is hypothesized that although different risk and protective factors will be identified according to ethnicity, the score for the weighted compensatory model will correlate more highly with all measures of achievement than the weighted and unweighted main effect, additive, and multiplicative models and that scores of weighted models will correlated more highly with achievement than scores of unweighted models.

Methodology

Data Set

A baseline of data (National Education Longitudinal study of 1988) on school experiences was collected on a stratified sample of approximately 25,000 eighth grade children in 1052 schools across the United States. Four components constitute the base year study design. The first component consisted of student questionnaires designed to gather information pertaining to basic background, attitudes about school, grades, self-esteem, future expectations, and social relationships. Students were administered cognitive

tests in reading, mathematics, science and social studies. The second component consisted of parent questionnaires. One parent of each student was asked to fill out a questionnaire pertaining to education expectations for their child, amount of support they give to their child, and other family characteristics relevant to achievement, such as size of family, income, and the like. The third component consisted of selecting a teacher of each sampled student to complete a questionnaire designed to collect information about classroom practices, school, and teacher characteristics. The fourth component consisted of a school administrator questionnaire which was completed by the designated school administrator. The purpose of the questionnaire was to gather descriptive information about the teaching staff, school climate, student body characteristics, and school policies.

Subjects

Subjects have been chose from the NELS:88 sample who meet the following selection criteria: students come from families whose income is in the first quartile (approximately $15,000 per year and below); students are English proficient enough to have filled out the questionnaire with no assistance; students attend a public, urban school in their neighborhood. Ethnicity, such as Mexican-American, Black, and white will be noted so that variation among risk and protective factors and achievement can be examined according

to ethnicity. Mexican-American is defined as students who indicate they are Mexican-American, nonBlack on the student questionnaire. Black is defined as students who indicate they are Black, nonHispanic on the student questionnaire. White is defined as white, not of Hispanic origin.

Total sample equals approximately 900 students; approximately 500 are Black students;200 are Mexican-American, and 200 are white.

Procedures

Procedures for the identification of Risk and Protective factors, or, variables for the total sample as well as for Black, Mexican-American, and white students were followed as stated:

Step One. Step one was choosing Risk and Protective factors from the literature. Risk and Protective factors are those influences having the greatest impact on child development as identified in risk literature (Anthony, 1974;Bronfenbrenner,1979; Chess,1984; Garmezy,1981;Ogbu, 1986;Ramey,1986; Rutter,1976; Werner,1986) They are:

Child Domain. Child characteristics include:gender, child health, birth order, presence of a handicap, attendance in school, temperament,and IQ.

Family Domain. Family characteristics include: marital status, parent education, parent occupation, home language proficiency,residential stability, number of siblings,

stability of parental employment, Family interaction characteristics include: caretaking stability, parent monitoring of child's activities, parent expectation of child educational achievement,nature of parent/child interaction, parent/child communication, and parent participation in schooling activities.

Neighborhood Domain.Neighborhood characteristics include:neighborhood safety, availability and use of community programs, and number of parents who participate in child's school.

School Domain. School level variables include: teacher rate of turnover, quality of programs (remedial versus accelerated programs), school safety, school control (includes school size, number of students receiving special services); teacher characteristics include: teaching experience, level of education, teacher stability (attendance and years taught at the same school); instructional characteristics include: teacher expectation of student achievement, communication with parents, style of discipline, instructional time; classroom level variables include: number of LEP students and class size;

Step Two. Step two was operationalizing Risk and Protective factors. To the extent possible, Risk and Protective factors have been operationalized based upon questionnaire items from NELS:88 student, teacher, parent, and school questionnaires. Risk and Protective factors represent child, family, school, and neighborhood domains.

Step Three. Step four was identifying Risk and Protective factors for each ethnic group. Risk and Protective factors were chosen for each ethnic group based upon a correlation of the representative questionnaire item with Reading or Math Achievement at .10 or greater and at maximum p value of .05 (see Appendix, Table 17).

Achievement Measures

Achievement has been obtained from three sources from NELS:88: GPA as reported by student; scores on psychometric Reading and Mathematics Achievement tests. The Reading Achievement test contained 21 items and took 21 minutes to complete. It consisted of five short passages followed by comprehension and interpretation questions. The Mathematics Achievement test contained 40 items and took 30 minutes to complete. It consisted of quantitative comparisons and other questions assessing mathematical knowledge. The Reading and Mathematics tests were administered in a single group session (Ingalls, 1990). Scores are presented in standardized form ranging from scores of 20 to 80 with a mean for the total population (24,500 students) of 50 and a standard deviation of 10.

Statistical Analysis

Data representing risk and protective factors were gathered and scores computed for each sample child. Preliminary analyses were performed to determine scores representing Risk and Protective status for each variable by ethnicity. This was determined by obtaining the mean score for each variable by ethnicity (see Appendix, Table 18 for mean scores). For most variables, a score below the mean constituted a Risk factor and a score above the mean constituted a Protective factor, although the reverse was sometimes true (for a matrix of risk and protective factors, see Appendix for Table__). Final analyses were performed by assigning each child a Risk and/or Protective factor score for each variable in order to compare the five predictive models. Scores were analyzed in order to test the five models:

Main Effect Model. All Risk factors were identified through preliminary analyses and correlated with achievement scores of GPA, Mathematics Achievement and Reading Achievement. The Risk factor with the highest correlation with any measure of achievement was identified as the score for the main effect model. This procedure was followed for each ethnic group.

Additive Model. Risk factor scores were computed and added for each student. A correlation between the resultant

scores and all three measures of achievement was obtained. Separate correlations were obtained for each ethnic group.

Weighted Additive Model. Risk factor scores were computed, weighted, and added for each student. A correlation between the resultant scores and all three measures of achievement was obtained for all three ethnic groups.

Multiplicative Model. Risk factor scores were computed and multiplied. A correlation was obtained between the resultant scores and achievement scores for each ethnic group.

Weighted Multiplicative Model. Risk factor scores were computed, weighted, and multiplied. A correlation was obtained between the resultant scores and achievement score for all three ethnic groups.

Compensatory Model. Risk and Protective factor scores were computed and combined by assigning a negative score to the risk factors and a positive score to the Protective factors. Scores were combined and a correlation was obtained between the resultant scores and achievement scores.

Weighted Compensatory Model. Risk and Protective factor scores were computed, weighted, and combined by assigning a negative score to the Risk factors and a Positive score to the Protective factors. Scores were combined and a correlation was obtained between the resultant scores and achievement scores.

Results

Descriptive Statistics of Total Sample

Means, standard deviations, and range of scores are presented in Table 1 for three measures of achievement for a NELS:88 sample of approximately 900 low income (total family income of $15,000 and below) eighth grade students attending a public neighborhood school: a student self-report grade point average of grades in English, Mathematics, Science, and Social Studies over a time period of sixth to eighth grade; score on the Mathematics Achievement test designed for NELS:88; score on the Reading Achievement test designed for NELS:88.

Means and standard deviations for the total sample by gender are presented in Table 2.

Table 1

Means, Standard Deviations, and Range of Achievement Scores for Total Sample

Achievement	N	Mean	SD	Range of Scores Possible
Mathematics	1237	43.52	8.05	20-70
Reading	1241	43.71	8.55	20-70
Grade Point Average	1224	2.57	.73	.5-4.0

Table 2

Means, Standard Deviations, of Total Sample by Gender

	Mathematics			Reading			Grade Point Average		
Gender	N	Mean	SD	N	Mean	SD	N	Mean	SD
Girls	648	43.12	7.7	646	44.3	8.6	639	2.7	.70
Boys	583	44.00	8.4	589	43.10	.84	579	2.5	.76

Descriptive Statistics by Ethnicity and Gender

Means and standard deviations of achievement scores by ethnic group and gender are presented in Tables 3 through 7.

Ethnicity is indicated by student responses to Student Questionnaire item numbers 31A and 31C: Which best describes you? Students selected were those who responded: Black, but not of Hispanic origin; white, but not of Hispanic origin; Mexican, Mexican-American, Chicano.

Table 3

Means and Standard Deviations of Achievement Measures by Ethnic Groups

	Black			White			Mex-American		
Achievement	N	Mean	SD	N	Mean	SD	N	Mean	SD
Mathematics	502	41.67	6.79	215	47.06	9.32	222	43.34	7.16
Reading	502	42.32	7.65	218	46.84	10.23	222	44.12	7.34
Grade Point Average	496	2.53	.69	213	2.45	.77	219	2.60	.73

Table 4

Means and Standard Deviations of Achievement by Gender and Total of White, Black, and Mex-American Students

	Male			Female		
Achievement	N	Mean	SD	N	Mean	SD
Mathematics	102	43.77	7.8	119	43.03	6.6
Reading	104	43.81	7.4	117	44.33	7.4
Grade Point Average	104	2.5	.8	114	2.7	.64

Table 5

Means and Standard Deviations of Achievement by Gender for Black Students

	Male			Female		
Achievement	N	Mean	SD	N	Mean	SD
Mathematics	228	41.86	7.1	271	41.54	6.5
Reading	229	40.91	7.1	270	43.62	7.8
Grade Point Average	225	2.43	.74	268	2.62	.63

Table 6

Means and Standard Deviations of Achievement by Gender for Mex-American Students

	Male			Female		
Achievement	N	Mean	SD	N	Mean	SD
Mathematics	102	43.77	7.8	119	43.03	6.6
Reading	104	43.81	7.4	117	44.33	7.4
Grade Point Average	104	2.46	.80	114	2.7	.64

Table 7

Means and Standard Deviations of Achievement by Gender for White Students

	Male			Female		
Achievement	N	Mean	SD	N	Mean	SD
Mathematics	100	47.92	9.7	115	46.31	8.9
Reading	101	46.08	10.2	117	47.48	10.3
Grade Point Average	97	2.39	.79	116	2.50	.75

One-way ANOVA by Ethnicity on Achievement

Differences among the three ethnic groups on all measures of achievement were examined. Results of a one-way ANOVA by ethnicity on achievement are presented in Tables 8, 9, and 10:

Table 8

One-way ANOVA Summary of Mathematics Achievement by Ethnic Group

(N white students= 215; N Black students= 499; N Mex-American students= 221)

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squared	F	P
Between Group	4367778.34	2	2183889.17	38.58	.0001
Within Groups	52988352.11	936	56611.49		
Total	57356130.45	938			

Table 9

One-way ANOVA Summary of Reading Achievement by Ethnic Group

(N white students=219; N Black students= 499; N Mex-American students = 221)

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squared	F	p
Between Groups	3128622.40	2	1564311.20	22.98	.0001
Within Groups	63917176.41	939	68069.41		
Total	67045798.81	941			

Table 10

One-way ANOVA Summary of Grade Point Average by Ethnic Group

(N white students=213; N black students=493; Mex-American students N= 218)

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squared	F	p
Between Groups	24.26	2	12.13	2.35	.0962
Within Groups	4780.87	925	5.17		
Total	4805.14	927			

Significant differences exist between scores of Black, Mexican-American, and white students on Reading and Mathematics achievement tests. There were not significant differences among the three ethnic groups on Grade Point Average. A Post hoc analysis was run using Tukey 's HSD

studentized range test to analyze differences in Reading and Mathematics achievement between specific ethnic groups. Analyses are presented in Tables 11 and 12:

Table 11

Tukey's (HSD) Studentized Range for Reading Achievement

Ethnic Comparison	Lower Confidence Limit	Upper Confidence Limit	df	CV	p
White-Mex-American	913.1	4585.2	932	3.320	.05
White-Black	2901.5	6024.7			.05
Mex-American-Black	159.8	3268.1			.05

Table 12

Tukey's Studentized Range (HSD) for Mathematics Achievement

Ethnic Comparison	Lower Confidence Limit	Upper Confidence Limit	df	CV	p
White-Mex-American	1994.5	5382.3	929	3.320	.05
White-Black	3931.1	6816.3			.05
Mex-American-Black	256.4	3114.1			.05

Pairwise comparisons indicate significant differences between all pairs of ethnic groups. Results of Tukey's studentized range for Mathematics and Reading achievement tests and the Table of Means (see Table 3) reveal that white

students achieved significantly higher Reading and Mathematics achievement scores than Mexican-American and Black students, and that Mexican-American students achieved significantly higher Reading and Mathematics achievement scores than Black students.

Two-way ANOVA by Ethnicity and Gender on Achievement

Reading Achievement, Mathematics Achievement, and Grade Point Average scores were examined by way of a 2x3 Factorial Analysis to determine possible main effects of gender and ethnicity and a possible interaction of gender and ethnicity. Results are presented in Tables 13, 14, and 15:

Table 13

Two-way ANOVA Summary of Ethnic Group by Gender on Mathematics Achievement

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squared	F	p
Between Groups					
Ethnicity	4339711.084	2	2169855.542	38.24	.0001
Gender	130434.609	1	130434.609	2.30	.1298
Two-way Interaction	51928.090	2	25964.045	.46	.6330
Within Groups	52714103.801	929	56742.846		
Total	57236177.584	934			

Table 14

Two-Way ANOVA Summary of Ethnic Group by Gender on Reading Achievement

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squared	F	p
Between Groups					
Ethnicity	3043647.448	2	1521823.724	22.67	.0001
Gender	818740.544	1	818740.544	12.20	.0005
Two-way Interaction	212455.316	2	106227.658	1.58	.2060
Within Groups	62568901.815	932	67134.015		
Total	66643745.123	937			

Table 15

Two-way ANOVA Summary of Ethnic Group by Gender on Grade Point Average

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squared	F	p
Between Groups					
Ethnicity	24.7	2	12.4	2.43	.0890
Gender	75.3	1	75.3	14.77	.0001
Two-way Interaction	7.1	2	3.6	0.70	.4982
Within Groups	4678.2	918	5.1		
Total	4785.3	923			

Results indicate a main effect of gender on Reading Achievement and Grade Point Average. Overall, girls achieved significantly higher scores in Reading achievement and Grade Point Average than boys. Another main effect was ethnicity on Reading and Mathematics Achievement. As stated above, there are differences among all ethnic groups on Mathematics and Reading achievement but not on Grade Point Average. There was no overall difference in Mathematics Achievement between boys and girls nor was there an interaction between gender and ethnicity.

Results of the Tukey-Kramer HSD pairwise and stepwise comparisons in Table 16 of boys and girls by ethnic groups on Reading achievement tests reveal significant differences. On Reading Achievement, Black male students scored significantly lower than everyone. White female students scored significantly higher than all but white male students.

Table 16

Tukey-Kramer HSD Pairwise and Stepwise Comparisons of Boys and Girls by Ethnic Groups on Reading Achievement

HSD F crit.=2.641 B=Boy G=Girl

	Black- B 40.91 n=229	Black-G 43.62 n=270	Mex-B 43.81 n=104	Mex-G 44.33 n=117	White-B 46.08 n=101	White-G 47.48 n=117
Black-B 40.91	____	2.71*	2.9 *	3.42 *	5.17*	6.57*
Black-G 43.62		___	.19	.71	2.46	3.86*
Mex-B 43.81			___	.52	2.27	3.67*
Mex-G 44.33				___	1.75	3.15*
White-B 46.08					___	1.4
White-G 47.48						___

* comparisons significant at the 0.05 level

Summary

In conclusion, there are overall differences among all ethnic groups on Reading and Mathematics Achievement but not Grade Point Average. There are differences in Reading Achievement and Grade Point Average between boys and girls for all low income students. There is no significant difference between boys and girls on Mathematics Achievement. Post hoc pairwise comparisons of gender differences by ethnicity on Reading Achievement reveal that white female students scored higher than all but white male students and

that black male students scored significantly lower than all other students.

Relationship between Achievement and Child, Family, Neighborhood and School Variables by Ethnicity

It was hypothesized that there would be Child, Family, Neighborhood, and School variables differentially correlated with achievement according to ethnicity. Results presented in Table 17 support the above hypothesis. The following significant Risk and Protective Variables and their correlations with Mathematics Achievement, Reading Achievement, and Grade Point Average are presented by domain for each ethnic group. These variables as well as their operationalizations by specific questionnaire items will be used to test each predictive model of achievement.

Significant Differences Among Means Of Child, Family, Neighborhood, and School Variables by Ethnicity

Presented in Table 18 are significant differences among means for Child, Family, Neighborhood, and School Risk and Protective variables for all ethnic groups.

Differences Between High and Low Achieving Students

It was hypothesized that there would be differences in mean scores of Risk and Protective variables between high and low-achieving Black, Mexican-American, and white students across all domains. This hypothesis was supported to some

extent. Results are presented in Tables 19 through 21 (see Appendix).

Comparison of Models of Risk

It was hypothesized that scores of the weighted compensatory model would correlate more highly with all three measures of achievement than scores of main effect, additive, and multiplicative models for all ethnic groups. Results presented in Table 22 indicate that the above stated hypothesis was supported in some cases, however, the strength of association between model score and achievement depends on (1) ethnic group (2) type of achievement. Overall, scores for all models for white students were more highly correlated with achievement than were for Black and Mexican-American students; scores for Mexican-American students were more highly correlated with achievement than were for Black students. For white students, the order of predictive power of all models for Mathematics Achievement is as follows: weighted additive, weighted compensatory, main effect, nonweighted additive and compensatory, and multiplicative; For Reading Achievement: weighted compensatory model, weighted additive, nonweighted additive, main effect, and multiplicative; For grade point average: weighted additive and compensatory, nonweighted compensatory and additive, main effect, and multiplicative. For Mexican-American students, the order of predictive power for Mathematics Achievement is

as follows: nonweighted additive, weighted additive, compensatory weighted and nonweighted, main effect, and multiplicative; For Reading Achievement: nonweighted additive, nonweighted compensatory, weighted compensatory, weighted additive, main effect and multiplicative; For Grade Point Average: weighted compensatory, main effect, nonweighted compensatory, weighted additive, and multiplicative. For Black students, the order of predictive power is as follows: for Mathematics Achievement: main effect, weighted and nonweighted compensatory, weighted additive, nonweighted additive and multiplicative; For Reading Achievement: weighted compensatory, weighted additive, nonweighted compensatory, main effect, nonweighted additive and multiplicative; For Grade Point Average: main effect, weighted compensatory, additive and multiplicative.

Discussion

Differences Among Achievement Scores Across Ethnicity

Findings indicate that there are differences among all ethnic groups in Reading and Mathematics Achievement in addition to gender differences within ethnic groups. White students achieved significantly higher scores than Black and Mexican-American students in Mathematics and Reading

Achievement. These differences indicate that there may be cultural and racial biases against Mexican-American and Black children occurring at the school and teacher levels (Persell, 1976). Significant gender differences were revealed between Black girls and boys on Reading Achievement. There were no significant gender differences on Mathematics Achievement.

Results indicate that Grade Point Average is not an accurate measure of between-classroom and school differences in achievement as are Reading and Mathematics Achievement which are appropriate measures of between-student, classroom, and school differences. There were no significant differences between ethnic groups nor gender on Grade Point Average. Grade Point Average appears to best reflect between-student differences within a classroom.

Correlations of Risk and Protective Factors with Achievement Across Ethnicity

Overall, there were more Risk and Protective variables that correlated significantly with Reading, Mathematics and Grade Point Average for white students than Mexican-American and Black students. There were more Risk factors present for Black students than white and Mexican-American, particularly in the school domain. For example, teacher time spent disciplining, time spent teaching small groups, and time

spent teaching individual groups negatively correlated with Math and Reading Achievement for Black students. There were several Risk and Protective variables that were present for all ethnic groups: Presence of a handicap, enrollment in a Gifted and Talented program, and parent expectation. There were some Risk and Protective factors that were common to two ethnic groups: presence of a behavior problem and number of 8th grade students receiving free lunch were common to white and Black students; supervision after school was common to Black and Mexican-American students; mother and father's level of education, parent communication with their child about school, and teacher expectation that the textbook is not too difficult for students were common to white and Mexican-American students.

Of particular interest are Risk and Protective variables that were significantly correlated with Mathematics and Reading achievement for white and Mexican-American students but not for Black students: mother's and father's education level and parent participation in schooling. Mean scores indicate that parent education levels of Black students are not significantly different from parents of white students and are significantly higher than parents of Mexican-American students yet are not correlated with achievement. In addition, parents of Black students participated in school activities more than parents of Mexican-American and white students yet

parent participation in school did not correlate with achievement for Black students.

Also of interest is the correlation between a parent helping their child with homework and achievement scores. Contrary to literature, this item negatively correlated with Mathematics and Grade Point Average for Mexican-American students. Although this item did not correlate significantly with achievement for Black students, there was a significant difference between the means of high and low-achieving Black students; the low-achieving Black students received more helped than the high-achieving students.

School size and class size correlations with achievement were also surprising. School size correlated positively with Mathematics and Reading Achievement for Mexican-American students. For white students, the mean differences between low and high-achieving students indicate that class sizes are larger for high-achieving students.

Differences Between High and Low-Achieving Students by Ethnicity

Descriptions of high and low-achieving Black, Mexican-American, and white students differ. Of particular interest are Protective factors which characterize high-achieving students. Protective factors for Black students are: enrollment in Gifted and Talented, high father's occupation level, high parent expectation, high degree of child monitoring, school safety, high teacher expectation, little

discipline, little time spent teaching small groups. Protective factors for Mexican-American students are: high level of mother's education, high parent expectation, high degree of child monitoring, use of neighborhood library by child, and increased time spent teaching class as a whole. Protective factors for white students are: enrollment in Gifted and Talented Program, high level of mother's and father's education, high degree of caretaking stability, high parent expectation, use of neighborhood library by child, and large classroom size.

Comparison of Predictive Models Achievement Across Ethnicity

It was hypothesized that the scores of the compensatory model would correlate more highly with all achievement scores across ethnicity. Based upon the concept that Protective factors exist that ameliorate, or, compensate for Risk factors, a score resulting from the adding of Protective factors to a Risk score should yield a score that correlates more highly with achievement than a Risk score alone. This hypothesis held true for Black students across all achievement scores. Since the resultant score of a compensatory model is smaller and has a narrower range than that of the multiplicative and additive, it appears to provides the best fit with the narrow range of achievement scores of Black students.

For white students, scores of the weighted compensatory model correlated more highly with Reading Achievement than scores of the additive, multiplicative, and main effect models. However, scores of the weighted additive model correlated more highly with Mathematics Achievement than that of the compensatory, multiplicative, and main effect models.

Results indicate the multiplicative model yielded the weakest correlations with achievement scores for all ethnicities across all achievement scores. One possible explanation is that since the range of outcome for low income children used in this study is already reduced, a multiplicative approach may yield too wide a range of scores and therefore not provide the best fit between model and outcome. Supportive of this explanation are results that indicate achievement scores of white students varied more than Mexican-American and Black students, and that Mexican-American student scores varied more than Black students'. Scores of the multiplicative model correlate more highly with achievement for white students, Mexican-American, and Black students accordingly.

It was hypothesized that a weighted model would be more predictive of achievement than scores of nonweighted models across ethnicity and achievement scores. This held true for white students for Math Achievement and Reading Achievement but did not hold true for Mexican-American students and Black student. Since the weighted models are similar to

multiplicative models in that weights of 1, 2, or 3 are multiplied by the Risk and Protective variables, the range of scores is wider for the weighted model. This approach is more suited for white students who exhibit a wider range of achievement outcomes than Black and Mexican-American students.

Limitations of Study

Using NELS:88 questionnaires presented several difficulties. First, it was difficult to assess all of the most significant Risk and Protective factors as described in risk literature. In particular, it was not possible to represent important family interaction variables such as the nature of mother-child interaction as well as child characteristics such as temperament and IQ. Understandably, not all Risk factors can be represented in a questionnaire, particularly those of a sensitive nature. Rutter, in accordance with many risk researchers, has described the importance of maternal mental health and its impact on child development (Rutter, 1979). However, a questionnaire is not the correct instrument for gathering such highly sensitive and confidential information.

There were limitations in operationalizing the Risk and Protective factors that were used. Obtaining the best Risk and Protective variables was dependant upon using

questionnaire items or composite of items which in many instances did not represent Risk and Protective constructs. For example, while the question for parent expectation of their child's future educational attainment was clearly stated, there were no clearly stated questions pertaining to teacher expectation of student performance. Rather, there were questions that could possibly relate to teacher expectation, such as how much of the textbook did the teacher believe the students would cover this year, and, is the textbook too difficult for the students. Often only part of a construct could be represented. For example, the amount of time a teacher disciplines versus rewards students could only be represented by the amount of time a teacher spent disciplining students. There was no question pertaining to rewards given to students.

Representing Risk and Protective factors at appropriate levels of analysis was also difficult. For example representing the quality of school programs could not be accomplished for this population through the school questionnaire items. It was anticipated that the number of students enrolled in the Gifted and Talented program would provide an indication of ratio of accelerated to remedial school programs, a documented protective factor which represents to what extent a school provides opportunity to learn (Persell,1977). However, this item did not significantly correlate with any measure of achievement.

Oddly enough, though, the parent item which asked, "Is your child currently enrolled in a Gifted and Talented Program?" was highly correlated with achievement for all ethnic groups.

Another limitation is the inability to adequately represent Risk and Protective factors associated with achievement for Mexican-American and Black students. Although the findings were not robust for white students, they were even weaker for Black and Mexican-American students and weak for low income children overall. The most variance of achievement outcome accounted for for white students was 25% and 9% for Mexican-American and Black students. This suggests that the NELS:88 questionnaires are not suited for capturing important child, family, neighborhood, and school characteristics of low income children and, in particular, low income Black and Mexican-American children.

One final limitation of the study concerns the age of the sampled chldren. In order to capture a true representation of children living in a high risk environment, it would have been preferable to have sampled a younger population since many children may have succumbed to overwhelming risk conditions by dropping out of school before the eighth grade.

Recommendations

Several considerations for further studies of children at risk for low achievement due to environmental risk factors are recommended. Future studies should provide a variety of data gathering methods and sources in order to capture data that may be of a sensitive nature but important to child development. Risk and Protective factors unique to all low income children need to be defined and represented. In particular, child, family, neighborhood, and school Risk and Protective factors specific to ethnicity should be defined and represented. It is clear that important variables associated with achievement for Black male children have not been represented in the NELS:88 questionnaires. In addition, NELS:88 lacks questions concerning a student's community. In particular, Risk and Protective factors such as neighborhood safety need to be represented. Finally, the predictive power of models depends not only upon representing Risk and Protective factors unique to and representative of contributors to achievement for particular ethnic groups but upon obtaining the best fit between the model and the range of achievement outcomes.

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Appendix

Risk and Protective Factor Matrix

Risk Factors	Protective Factors	Risk and Protective Variables
	Child Domain	
• Negative temperament	•Positive temperament	•Temperament
•Low IQ	•High IQ	•IQ
•Handicapped		•Presence of a handicap
•Has a behavior problem		•Presence of a behavior problem
•Low	•High	•Birth order
•Low	•High	•Attendance rate in school
	Family Domain	
	Family Characteristics	
•+4 siblings	•4- sibings	•Number of siblings
•Crowded		• Living space and conditions
•Unstable residence		• Residential stability
•Parent has unstable work	•Parent has stable job	•Stability of employment
•Div,sep, death of parent		•Marital status
•Low par ed	•High par ed	• Par education level
•Low occ	•High occ	• Par occupation level
•LEP		•Home language proficiency
	Family Interaction	
•Unstable caretaking	•Stable caretaker	•Caretaking
•Unsafe home	•Safe home	• Home safety
•Low level of mon.	•High level of mon.	• Monitoring of child's activities
•Little communication	•Much communication	•Parent/child communication
•Low par ed exp	•High par ed exp	• Par expectation
•Low part	•High part	• Par participation in schooling activities
	Neighborhood Domain	
•Unsafe	•Safe	•Neighborhood safety
•Low	•High parent participation	•Parent participation in

Risk and Protective Matrix

		neighborhood school organization
•Low	•High	•Use of community resources
	<u>School Domain</u>	
•High teacher turnover	•Teacher stability	•Teacher stability
•High # of rem prog	•High # of acc prog	•Number of accelerated programs
•Low level of funding	•High level of funding	• Level of funding
•Unsafe	•Safe	•School Safety
•Large size	•Small size	•School Control
•Negative	•Positive	•School Climate
	Teacher Characteristics	
•Little experience	•Much experience	•Teacher experience
•Little education	•Much education	•Teacher Education
•Unstable attendance	•Stable attendance	•Teacher stability
	Instructional Characteristics	
•Low teacher exp	•High teacher exp	•Teacher Expectation
•Much time spent discipline discliplining	•Rewards students	•Style of
•Doesn't feel prepared	•Feels prepared	•Teacher preparedness
•Little time instructing	•Much time on instruction	•Time spent on instruction
•Doesn't comm w par	• Communicates w par	•Teacher/par communication
	Classroom Characteristics	
•High# of LEP students		•English proficiency of students
•High # of students	•Low # of students	•Class size
•Remedial	•Accelarated	•Program quality

Table 17

Table 17

Significant Correlations of Child, Family, Neighborhood, and School Variables of Black, Mexican-American, and White Students and Achievement *

Variables and Questionnaire Items	Mathematics W n=220	Mathematics B n=500	Mathematics M n=220	Reading W n=220	Reading B n=500	Reading M n=220	Grade Point Average W n=220	Grade Point Average B n=500	Grade Point Average M n=220
Child Domain									
Birth Order Item:Bys33 Number of Older Siblings:1=none to 7=6+	---	---	---	-.139	---	---	---	---	---
Behavior Problem Item:Byp57e How many times have you been contacted about your child's behavior? 1=none to 4=4+	-.172	-.123	---	-.158	-.166	---	-.373	-.220	---
Presence of a Handicap Item:BYP49d Does your child receive special education services? 1=yes 2=no	.164	.140	.167	.205	.182	.164	.192	---	.180

Table 17

Variables and Questionnaire Items	Mathematics W n=220	Mathematics B n=500	Mathematics M n=220	Reading W n=220	Reading B n=500	Reading M n=220	Grade Point Average W n=220	Grade Point Average B n=500	Grade Point Average M n=220
Item:Byp51 Enrolled in Gifted/Talented Program 1=yes 2=no	.390	.233	.150	.384	.180	.160	.324	.120	.145
Attendance Item: BYS75 How many days have you missed in the past four weeks? 1=no days missed to 5=10+ days	-.198	___	___	___	___	___	-.186	-.183	-.225
Family Domain									
Family Characteristics Number of siblings Item:BYS32 1=none to 7=6+	-.188	___	___	-.217	___	___	___	___	___
Mother's Education Item:Byp40 1=Finished 8th grade to 13=Ph.D.	.313	___	___	.256	___	.261	___	___	___
Father's Education Item: byp31	.377	___	___	.268	___	.218	___	___	.262
Father's Occupation Item byp37b (recoded using Hollingshead 1 to 9 scale)	___	.242	___	___	___	___	___	___	___

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Table 17

Variables and Questionnaire Items	Mathematics W n=220	Mathematics B n=500	Mathematics M n=220	Reading W n=220	Reading B n=500	Reading M n=220	Grade Point Average W n=220	Grade Point Average B n=500	Grade Point Average M n=220
Caretaking Stability									
Item: Bpy1b How much time child lives with parent 1=fulltime 2=more than halftime 3=halftime 4=less than halftime 5=none	___	___	___	-.200	___	___	___	___	___
Home Language Proficiency									
Item:BYE25b How well speaks language other than English 1=very well 2=pretty well 3=well 4=not very well 5=not at all well	___	___	___	___	___	-.141	___	___	___
Family Interaction									
Degree of Child Monitoring									
Item:BYS40h How often is no one home when child returns from school? 1=usually no one home 2=sometimes 3=rarely 4=never no one home	___	.203	.140	___	.182	___	___	.137	___
Parent/Child Communication									
Item: BYP66 How often parent communicates with child about school 1=not at all 2=rarely 3=occasionally 4=regularly	___	___	___	.158	___	.154	___	___	___

Table 17

Variables and Questionnaire Items	Mathematics W n=220	Mathematics B n=500	Mathematics M n=220	Reading W n=220	Reading B n=500	Reading M n=220	Grade Point Average W n=220	Grade Point Average B n=500	Grade Point Average M n=220
Parental expectation of child's future Educational Attainment Item: BYP76 1=less than High School Graduation 2=GED 3= High School Graduation 4=one year Vocational Education 5=1-2 years 6=2+ 7=less than 2 years college 8=2+ 9=2 year program 10=4 years of college 11=Master's 12=Ph.D.	.386	.223	.206	.400	.200	.250	.300	.163	.290
Parent Participation in Schooling Activities Item: BYP59B How often parent goes to meetings 1=yes 2=no Item:Byp69 Parent helps child with homework: 1=seldom to 4=almost everyday	---	---	---	---	---	-.178	---	---	-.189
				Neighborhood Domain					
Use of Community Resources									
Child Uses Neighborhood Library 1=yes 2=no	.185	---	---	.300	---	.240	---	---	---
Parent Belongs to Neighborhood School Organization 1=yes 2=no	---	---	---	---	---	-.151	---	---	---

Table 17

Variables and Questionnaire Items	Mathematics W n=220	Mathematics B n=500	Mathematics M n=220	Reading W n=220	Reading B n=500	Reading M n=220	Grade Point Average W n=220	Grade Point Average B n=500	Grade Point Average M n=220
				School Domain					
School Characteristics									
School Control									
School Size									
Total school enrollment									
Item:Byscenrol									
1=1-199 2=200-399 3=400-599									
4=600-799 5=800-999 6=1000-1199									
7=1200+	___	___	.135	___	.106	___	___	___	___
Percent 8th grade minority students									
Item:q8cminore									
1=1-5 2=6-10 3=11-20									
4=21-40 5=41-60 6=61-90									
7=91-100	___	___	-.237	-.158	___	___	___	___	___
Percent 8th grade students receiving free lunch									
Item: q8lunche									
1=1-5 2=6-10 3=11-20									
4=21-30 5=31-50 6=51-75									
7=76-100	-.162	-.105	___	-.225	___	____	___	.119	___
Average Daily Attendance									
Item: Byscll									
(reported in %)	___	.114	___	___	___	.134	___	___	___

Table 17

Variables and Questionnaire Items	Mathematics W n=220	Mathematics B n=500	Mathematics M n=220	Reading W n=220	Reading B n=500	Reading M n=220	Grade Point Average W n=220	Grade Point Average B n=500	Grade Point Average M n=220
School safety									
Student Use of drugs Item:BT3_26hh 1=serious to 4=not a problem	---	---	.160		.100	.173	---	---	---
Verbal Abuse of Teachers Item:Bys58k 1=serious to 4=not a problem	.140	.154	.160		.180	.10 .173	---	---	---
Teacher characteristics									
Years of education Item: BT3_8	---	.103	---	---	---	---	---	---	---
Teaching Experience Years of teaching experience at the elementary and secondary level Item: BT3_4	---	---	---	---	---	.153	---	---	---
Teacher Stability Teacher's rate of attendance Item: BT3_28 Days absent during first semester: 1=none 2=1-2 3=3-4 4=5-7 5=8-11 6=12+	.168	---	---	.155	---	---	---	---	---
Years taught at same school Item: BT3_5 years taught at this school	---	---	---	---	---	.209	---	---	---

Table 17

Variables and Questionnaire Items	Mathematics W n=220	Mathematics B n=500	Mathematics M n=220	Reading W n=220	Reading B n=500	Reading M n=220	Grade Point Average W n=220	Grade Point Average B n=500	Grade Point Average M n=220
Classroom characteristics									
Number of students									
Item: BT2_3	.316	___	___	.300	___	___	.154	___	___
Number of LEF students									
Item: BT2_6	___	___	-.234	___	___	___	___	___	___
Instructional Characteristics									
Teacher expectation of student achievement									
Item: BT2_11 What % of the book expected to be covered 1=0-49 2=50-59 3=60-69 4=70-79 5=80-89 6=90-99 7=100	___	.123	___	.163	___	___	___	.120	___
Item: BT2_12a Book is too difficult for my students 1=strongly agree to 5=strongly disagree	.173	___	.175	.162	___	___	.153	___	___
Item:BT2_7 Amount of Homework assigned each week (reported in hours and minutes)	.150	___	___	___	.133	___	___	___	___

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Table 17

Variables and Questionnaire Items	Mathematics W n=220	Mathematics B n=500	Mathematics M n=220	Reading W n=220	Reading B n=500	Reading M n=220	Grade Point Average W n=220	Grade Point Average B n=500	Grade Point Average M n=220
Style of Discipline									
Time spent disciplining each week Item: BT2_16do 1=none 2=<1hour 3=1 hour 4=2 hours 5=3 hours 6=4 hours 7=5+ hours	___	-.140	___	___	-.106	___	___	___	___
Time spent teaching class as a whole Item: BT2_16a 1=none to 7=5+ hours	-.165	___	___	___	___	.155	___	___	___
Time spent teaching small groups Item: BT2_16b 1=none to 7=5+ hours	___	-.116	___	___	-.122	___	___	___	___
Time spent teaching individuals Item:BT2_16c 1=none to 7=5+ hours	___	___	___	___	-.115	___	___	___	___

* p< .05

Table 18

Table 18

Significant Differences Among Means of Child, Family,Neighborhood, and School Variables of Black, Mexican-American, and White Students *

Variables and Questionnaire Items		White(1)	Black(2)	Mexican(3)	F	p	Tukey HSD p<.05
			Child Domain				
Birth Order							
Item: BYS33							
How many siblings are							
older than you?	M=	1.59	1.65	1.82			
1=none	N=	217	496	224	.96	.3842	
7=6+	sd=	(1.79)	(1.83)	(1.94)			
Behavior Problem							
Item: BYP57e							
How many times have you been contacted about your child's behavior?		1.64	1.83	1.54	8.29	.0003	(2)-(1)
1=none 4=4+		213	472	213			(2)-(3)
		(.90)	(.94)	(.83)			

Table 18

Variables and Questionnaire Items	White(1)	Black(2)	Mexican(3)	F	p	Tukey HSD p<.05
Presence of a Handicap						
Item:BYP49d Does your child receive special education services? 1=yes 2=no	1.96 211 (.20)	1.95 489 (.22)	1.97 208 (.18)	.54	.5857	
Attendance						
Item: BYS75 How many days missed over past 4 weeks. 1-none5=10+	1.30 208 (1.15)	1.10 450 (.11)	1.10 211 (1.14)	2.44	.0877	
		Family Domain				
Family Characteristics						
Number of sibling Item:BYS32 How many brothers and sisters do you have? 1=none 7=6+	2.74 216 (1.78)	3.06 500 (1.81)	3.35 223 (1.71)	6.41	.0017	(1)-(3)

Table 18

Variables and Questionnaire Items	White(1)	Black(2)	Mexican(3)	F	p	Tukey HSD p<.05
Mother's level of education	4.97	4.80	2.89			
Item Byp30	218	505	222	46.71	.0001	(3)-(1)
From 1=eighth grade or less to 13=Ph.D.	(2.85)	(2.66)	(2.44)			(3)-(2)
Father's level of education	4.50	4.63	2.62			
	115	160	134	22.93	.0001	(2)-(3)
	(2.90)	(2.83)	(2.49)			(1)-(3)
Father's level of Occupation	2.91	2.70	2.28			
(recoded using Hollingshead scale 1 to 9)	94	110	112	5.90	.003	(1)-(3)
	(1.55)	(1.42)	(1.00)			
Caretaking Stability						
Item:BPY1b	1.10	1.05	1.10			
How much time child	218	506	221	1.34	.2613	
lives with parent	(.47)	(.32)	(.46)			
1=all the time						
2=more than half						
3=half						
4=less than half						
5=none						

Table 18

Variables and Questionnaire Items	White(1)	Black(2)	Mexican(3)	F	p	Tukey HSD p<.05
Home language Proficiency						
Item:BYP25b How well do you speak a language at home other than English? 1=very well 2=pretty well 3=not very well 4=not well *(above 4= no response)	*8.44 218 (1.91)	*8.68 506 (1.48)	2.96 224 (3.03)	653.88	0.0	(3)-(1) (3)-(2)
Family Interaction						
Degree of Child Monitoring Supervision after school Item:BYS40h How often is no one home when child returns from school ? 1=usually 2=sometimes 3=rarely 4=never	2.78 201 (1.05)	2.69 425 (1.08)	2.99 202 (1.06)	5.38	.0048	(2)-(3)

Table 18

Variables and Questionnaire Items	White(1)	Black(2)	Mexican(3)	F	p	Tukey HSD p<.05
Parent Communication with Child						
Item: BYP66 How often parent communicates with child about school	3.55	3.64	3.43			
1=not at all	215	490	215	7.39	.0007	(2)-(3)
2=rarely	(.74)	(.61)	(.77)			
3=occasionally						
4=regularly						
Parental expectation of child's future ed						
Item: BYP76	7.29	7.92	7.61			
How far in school	217	502	224	3.31	.037	(2)-(1)
do you expect your	(3.09)	(3.12)	(3.10)			
child to go?						
1=less than High School						
2=GED						
3=High School Graduation						
4=less than one year vocational						
5=1-2 years						
6=2 years or more						
7=less than 2 years college						
8=two ore more years of college						
9=two year program						
10=four year program						
11=Master's degree						
12=Ph.D.						

Table 18

Variables and Questionnaire Items	White(1)	Black(2)	Mexican(3)	F	p	Tukey HSD p<.05
Parent Participation in Schooling Activities						
Item: BYP59B How often parent goes to meetings	1.80 209 (.40)	1.59 456 (.49)	1.72 210 (.45)	16.54	.0001	(2)-(1) (2)-(3)
Item BYP69 How often do you/spouse help with homework? 1=seldom 4=almost everyday	2.19 212 (1.05)	2.36 484 (1.13)	1.86 213 1.01)	15.80	.0001	(2)-(3) (1)-(3)
		Neighborhood Domain				
Use of Community Services						
BYP61ab Does your child borrow books from the library? 1=yes 2=no	1.24 (.43)	1.27 (.45)	1.35 (.48)			

Table 18

Variables and Questionnaire Items	White(1)	Black(2)	Mexican(3)	F	p	Tukey HSD p<.05
Item: byp59e Do you/spouse belong to neighborhood school organization? 1=yes 2=no	1.94 (.24)	1.88 (.33)	1.94 (.24)			
School Domain						
School Characteristics						
Number of students						
Item:Byscenrol number of students enrolled in school 1=1-199 to 7=1200+	4.71 208 (1.39)	4.48 462 (1.44)	5.11 203 (1.60)	13.17	.0001	(3)-(1) (3)-(2)
Percent of 8th grade minority students						
Item:g8cminore Percent of minority students 1=1-5% to 7=91-100%	4.17 208 (1.71)	6.00 457 (1.12)	6.02 197 (.98)	168.93	.0001	(1)-(3) (1)-(2)

Table 18

Variables and Questionnaire Items	White(1)	Black(2)	Mexican(3)	F	p	Tukey HSD p<.05
Overall student attendance						
Item: BYSc11	94.37	91.27	94.66			
average daily	52	123	41	13.67	.0001	(1)-(2)
attendance rate	(4.86)	(4.34)	(3.80)			(3)-(2)
(percent)						
Percent of 8th grade students receiving free lunch						
Item: g8lunche	4.36	5.60	4.84			
1=1-5% to 7=76-100%	203	462	203	46.82	.0001	(2)-(3)
	(1.71)	(1.34)	(2.05)			(2)-(1)
School safety						(1)-(3)
Student Use of drugs	2.84	3.01	2.68			
bt326hh	(.82)	(.81)	(.74)			
The degree to which student use of drugs is a problem.						
1=serious						
4=not a problem						
Verbal Abuse of Teachers	3.07	3.20	3.18			
bys58k						
1=serious						
4=not a problem	(1.12)	(1.11)	(1.10)			

Table 18

Variables and Questionnaire Items	White(1)	Black(2)	Mexican(3)	F	p	Tukey HSD p<.05
Teacher Level Variables						
Teacher characteristics						
Years of education						
Item: BT3_8	2.66	2.70	2.44	10.28	.0001	(2)-(3)
Highest degree	207	455	200			(1)-(3)
held.	(.70)	(.64)	(.70)			
1=less than bachelor's						
2=bachelor's						
3=Master's						
4=1 year past Master's						
5=Ph.D.						
6=M.D., L.L.B. etc.						
Years of teaching experience						
Item: BT3_4	5.60	5.92	4.94			
How many years	207	452	199	10.48	.0001	(2)-(3)
taught at elementary	(2.57)	(2.35)	(2.6)			(1)-(3)
or secondary level?						
Teacher's rate of attendance	2.44	2.50	2.62	1.03	.3573	
Item: BT3_28	206	454	203			
Days absent during	(1.15)	(1.31)	(1.15)			
first semester.						
1=none						
2=1-2						
3=3-4						
4=5-7 5=8-11 6=12+						

Table 18

Variables and Questionnaire Items	White(1)	Black(2)	Mexican(3)	F	p	Tukey HSD p<.05
Teacher stability						
Item: BT3_5						
years taught at this school	7.07	7.37	6.31			
	207	455	200	5.43	.0046	(2)-(3)
	(3.81)	(3.79)	(3.8)			
Classroom Characteristics						
Number of students						
Item: BT2_3	25.4	26.36	24.16			
	201	438	194	10.06	.0001	(2)-(3)
	(5.35)	(5.95)	(5.35)			
Number of LEP students						
Item: BT2_6	.242	.56	1.56			
	198	434	189	18.05	.0001	(3)-(2)
	(.70)	(2.07)	.70)			(3)-(1)
Instructional Characteristics						
Teacher expectation of student achievement						
Item: BT2_11	3.98	4.10	4.10			
	186	427	188	.37	.6890	
What % of the book expected to be covered	(1.74	(1.66)	(1.74)			

1=0-49%
2=50-59%
3=60-69%
4=70-79%
5=80-89%
6=90-99%
7=100%

Table 18

Variables and Questionnaire Items	White(1)	Black(2)	Mexican(3)	F	p	Tukey HSD p<.05
Item:BT2_12a						
Textbook is						
at a reading	3.81	3.57	3.53			
level which is too	194	431	187	4.09	.0171	(1)-(2)
difficult for	(.99)	(1.14)	(.99)			(1)-(3)
my students						
1=strongly agree						
5=strongly disagree						
Item:BT2_7						
Amount of homework						
assigned each week	2.02	2.46	1.80			
(reported in hours	201	437	193	13.69	.0001	(2)-(1)
and minutes)	(.34)	(1.67)	(1.46)			(2)-(3)
Instructional Style						
Time spent disciplining each week						
Item: BT2_16d	2.34	2.33	2.48			
1=none	198	435	190	1.01	.3643	
2=<1hour	(1.2)	(1.28)	(1.19)			
3=1hour						
4=2hours						
5=3 hours						
6=4 hours						
7=5+hours						

Table 18

Variables and Questionnaire Items	White(1)	Black(2)	Mexican(3)	F	p	Tukey HSD p<.05
Time spent teaching class as a whole each week						
Item: BT2_16ae	4.44	4.59	4.55			
1=none	198	435	192	.93	.3958	
2=<1 hour	(1.25)	(1.26)	(1.25)			
3=1 hour						
4=2 hours						
5=3 hours						
6=4hours						
7=5+hours						
Time spent teaching small groups each week						
Item: BT2_16b	2.36	2.39	2.48			
	194	429	187	.53	.5883	
	(1.24)	(1.30)	(1.24)			
Time spent teaching individuals each week						
Item:BT2_16c	2.56	2.59	2.67			
	199	433	189	.42	.6554	
	(1.17)	1.28)	(1.17)			

* p< .05

Table 19

Table 19

Significant Differences in Child, Family, Neighborhood,and School Variable Means for High and Low Achieving Black Students

Variable Name		Means Low	High	F	P
		Child Domain			
Child Characteristics					
Behavior Problem					
1=none to 4= 4+	M =	2.04	1.59	7.91	.006
	N =	69	61		
Presence of Handicap:					
Receiving Special Education Services:					
1=yes 2=no		1.92	2.00	5.58	.020
		76	66		
In Gifted/Talented Program:					
1=yes 2=no		1.94	1.72	13.84	.0003
		72	64		
		Family Domain			
Family Characteristics					
Father's Occupation		1.93	2.88	4.84	.0362
(see Hollingshead)		14	16		
1= 9=					

Table 19

Variable Name	Means Low	High	F	P
Family Interaction Characteristics				
Parent Expectation of Child's Future Educational Attainment: 1=less than High School Graduation 2=GED 3=High School Graduation 4=one year Vocational Education 5=1-2 years Vocational Education 6=2+ Vocational Education 7=Less than 2 years college 8=2+ year of college 9=2year program 10=4 years of college 11=Master's Degree 12=Ph.D. or equivalent	6.84 77	9.06 67	18.42	.0001
Degree of Child Monitoring Supervision After School: 1=usually no one home 2=sometimes 3=rarely 4=never no one home	2.24 63	2.88 58	11.77	.0008
Parent Helps with Homework: 1=seldom to 4=almost everyday	2.61 70	1.94 65	12.61	.0005

Table 19

Variable Name	Means Low	High	F	P
	School Domain			
School Characteristics				
School Safety				
Verbal Abuse of Teachers (Student Response)				
1=serious 2=moderate 3=minor 4=not a problem	3.34	2.75	9.96	.0020
	67	63		
Student use of Drugs				
(Teacher Response)	2.87	3.17	5.30	.0230
	68	67		
Teaching Characteristics				
Teacher Expectation:				
Amount of Homework Assigned Each Week				
(reported in hours and minutes)	2.08	2.87	7.06	.0089
	62	63		
Percent of Book expected to be covered:				
1=0-49 2=50-59 4=70-79 5=80-89 6=90-99				
7=100	3.83	4.50	5.03	.0268
	62	61		
Style of Discipline				
Amount of Time Spent Disciplining Each Week				
1=none 2=<1 hour 3=1 hour 4=2 hours 5=3 hours				
6=4hours 7=5+ hours	2.66	2.11	5.86	.0170
	62	62		
Time Spent Teaching				
Time Spent Teaching Small Groups Each Week	2.81	2.05	10.52	.0015
	62	62		

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Table 20

Table 20

Differences in Child, Family, Neighborhood, and School Variable Means for High and Low Achieving Mexican-American Students

Variable Name		Means Low n=25	High=41	F	P
		Child Domain			
Child Characteristics					
Presence of Handicap: Receiving Special Education Services: 1=yes 2=no	M=	1.86	2.00	6.45	.0138
	N=	21	40		
		Family Domain			
Family Characteristics					
Mother's Education: 1=Finished 8th grade to 13=Ph.D.		2.04	4.17	10.06	.0023
		25	41		
Family Interaction Characteristics					

Table 20

Variable Name	Means Low n=25	High=41	F	P
Parent Expectation of Child's Future Educational Attainment:				
1=less than High School Graduation 2=GED 3=High School Graduation 4=one year Vocational Education 5=1-2 years Vocational Education 6=2+ Vocational Education 7=Less than 2 years college 8=2+ year of college 9=2year program 10=4 years of college 11=Master's Degree 12=Ph.D. or equivalent	6.08 25	8.54 41	10.52	.0019
Degree of Child Monitoring				
Supervision After School: 1=usually no one home 2=sometimes 3=rarely 4=never no one home	2.42 19	3.18 39	7.05	.0103
	Neighborhood Domain			
Child Uses Neighborhood Library 1=yes 2=no	1.64 22	1.23 39	11.36	.0013
	School Domain			
Teacher Characteristics				
Time Spent Teaching Time Spent Teaching Class as a Whole Each Week	3.81 21	4.87 39	9.75	.0028

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Table 21

Table 21

Differences in Child, Family, Neighborhood, and School Variable Means for High and Low Achieving White Students

Variable Name	Means Low	High	F	P
	Child Domain			
Presence of Handicap:				
Receiving Special Education Services				
1=yes 2=no	1.84	2.00	13.81	.0003
	25	74		
In Gifted/Talented Program:				
1=yes 2=no	2.00	1.72	9.14	.0032
	24	75		
	Family Domain			
Number of Siblings	3.44	2.32	8.75	.0039
	27	76		
Mother's Education:				
1=Finished 8th grade to 13=Ph.D.	4.40	5.86	5.22	.0244
	27	76		
Father's Education	3.56	5.5	4.92	.0312
	16	36		

Table 21

Variable Name	Means Low	Means High	F	P
Family Interaction Characteristics				
Caretaking Stability Time chid lives with parent 1=fulltime 2=more than halftime 3=halftime 4=less than halftime 5=none	1.37 26	1.02 76	9.82	.0023
Parent Expectation of Child's Future Educational Attainment: 1=less than High School Graduation 2=GED 3=High School Graduation 4=one year Vocational Education 5=1-2 years Vocational Education 6=2+ Vocational Education 7=Less than 2 years college 8=2+ year of college 9=2year program 10=4 years of college 11=Master's Degree 12=Ph.D. or equivalent	5.20 26	8.70 76	29.95	.0001
	Neighborhood Domain			
Use of Community Resources Child Uses Neighborhood Library 1=yes 2=no	1.64 24	1.23 75	11.36	.0013

Table 21

Variable Name	Means Low	High	F	P
School Characteristics	School Domain			
Percent minority students 1=1-5% 2=6-10 3=11-20 4=21-40 5=41-60 6=61-90 7=91-100	4.7 26	3.9 72	5.49	.0211
Percent receiving free lunch 1=1-5 2=6-10 3=11-20 4=21-30 5=31-50 6=51-75 7=76-100	5.00 26	3.9 72	8.11	.0054
Classroom Characteristics				
Number of students	23.8 25	27.3 69	9.85	.0023

Table 22

Table 22

Significant Correlations Between Model Scores and Achievement*

	Mathematics			Reading			Grade Point Average		
Name of Model	White n=211	Black n=489	Mexican n=193	White n=211	Black n=489	Mexican n=193	White n=211	Black n=489	Mexican n=193
Main Effect	.386	.223	.206	.400	.200	.250	.300	.163	.290
Additive	.380	.170	.260	.400	.193	.344	.320	.050	.270
Weighted Additive	.490	.200	.250	.450	.260	.313	.340	.100	.285
Multiplicative	.190	.090	.100	.260	.112	.150	.201	.042	.160
Weighted Mult	.190	.090	.100	.260	.112	.150	.201	.042	.160
Compensatory	.380	.220	.220	.424	.261	.331	.320	.104	.330
Weighted Comp	.470	.220	.220	.453	.313	.310	.340	.153	.330

Table 23

Range and Means of Risk Factor Scores by Model and Ethnicity

Name of Model	White n=211	Black n=489	Mexican-American n=193
Additive			
- Possible Range	0-20	0-17	0-17
- Mean	10.6	10	8.23
- s.d.	2.38	3.69	1.98
Compensatory			
- Possible Range	-15-20	-7-17	-11-17
- Mean	3.64	6.07	2.56
- s.d.	4.20	4.52	3.57